

The replicate species of *Phlox* of the Pacific northwest*

HAROLD ST. JOHN

Certain species of *Phlox* (Polemoniaceae) have the hyaline membranous intercostal portion of the calyx-tube replicate or folded out into conspicuous sacs. Such is the case, for instance, in *Phlox longifolia* Nutt. This species and its relatives form the object of the present study.

The Herbarium of the State College of Washington is rich in material and contains some of the types of this group. Then, too, through the kindness of Dr. Aven Nelson, it has been possible to borrow some of the Elias Nelson types from the Rocky Mountain Herbarium. Dr. B. L. Robinson has likewise aided by lending original specimens from the Gray Herbarium.

The first northwestern replicate species to be described was *Phlox longifolia* Nutt. This was based on plants collected by Capt. Nathaniel J. Wyeth, "In the valleys of the Rocky Mountains generally." The specimens were collected by Wyeth on the return journey of his first expedition to Oregon. They probably came from western Montana, though Wyeth's Journal does not mention them definitely. This Wyeth collection, now in the Gray Herbarium, consists of four branches. Three of them are glabrous or nearly glabrate on the calyces, peduncles, and leaves, and agree with the phrase in the original description, "foliis . . . glabris." The remaining specimen is white puberulent on the calyces, peduncles, and stems. All have filiform leaves 0.5–1 mm. wide. Dr. Asa Gray maintained¹ the species, describing it as "nearly glabrous or pubescent, . . . leaves mostly narrowly linear."

The next member of this group of plants with the replicate calyx was collected by Charles A. Geyer in the "valley of the Kooskooskie River and the adjoining plains," or as it is now known, the lower Clearwater River, Idaho, and the Palouse Country of Idaho and adjacent Washington. It was published by Sir W. J. Hooker as *P. speciosa* Pursh, var. *linearifolia*.² A

* Contribution No. 46 from the Department of Botany, State College of Washington.

¹ Syn. Fl. N. Am. 2, pt. 1: 133, 1878.

² Journ Bot. Kew Miscell. 3: 289, 1851.

duplicate type specimen of this, *Geyer* 340, from the Gray Herbarium shows a large branch, with linear leaves, 2–2.7 mm. broad, and a white puberulence on the calyx, pedicels, and leaves. Dr. Gray raised this variety to specific rank,³ describing it in Latin, then eight years later translated his description into English⁴ as “Glabrous, above sometimes minutely hirsute-pubescent, . . . leaves very narrowly linear (an inch or two long, about a line wide).”

The next general treatment of these plants was by Elias Nelson in 1899 in his Revision of the Western North American Phloxes. Like Dr. Gray, he maintained the two plants as species, but characterised *P. longifolia* as with leaves 2–3 mm. wide, and *P. linearifolia* with leaves 1–1.5 mm. wide, and allowed both to have the leaves either glabrous or pubescent. He described several other species of the same general affinity.

A later monographic revision was published in 1907 by A. Brand.⁵ He maintained *P. longifolia* as an aggregate species, giving it a general inclusive range and description, but not citing any specimens or including any subsp. or var. *typica* along with the others. He treats as subsp. *linearifolia* (Gray) Brand the plants with leaves 1–2 mm. broad, and either puberulent or glabrous. Since the name started with Hooker, this authority should, of course, be corrected to read subsp. *linearifolia* (Hook.) Brand.

The original descriptions of these two plants are short and somewhat indefinite. The Wyeth type of *P. longifolia* Nutt. included a mixture of three glabrate plants with one puberulent plant. Dr. Gray's treatment allowed both variations of pubescence in both species. So also did Elias Nelson, but he divided the plants primarily on the width of the leaf. The latter student apparently did not see the type specimens of these two, or he could not have called the narrow leaved plant *linearifolia* and the broad leaved one *longifolia*, which is just the reverse of the nature of the original specimens. Brand continued this same error, at least for *linearifolia*. The treatments by the authors of the various current floras so closely follow these monographic treatments that they will not be discussed here in detail.

³ Proc. Am. Acad. 8: 255, 1870.

⁴ Syn. Fl. N. Am. 2, pt. 1: 133, 1878.

⁵ Pflanzenreich IV, fam. 250: 65, 1907.

A recent revision of this group by Dr. Aven Nelson appeared⁶ in 1931. His treatment is not essentially different from that of Elias Nelson, but he keys *P. longifolia* as with "Leaves 3 mm. or more broad, 4-8 cm. long," and *P. linearifolia* as with "Leaves 2 mm. or less broad, 3-6 cm. long."

A prolonged study of this group has made clear that the width of the leaf is a markedly variable character. A large series of specimens shows a gradual progression from ones as narrow as 0.5 mm. to those up to 3 mm. Even if 2 mm. is chosen as an arbitrary division point, it will separate the plants into two piles, but each of these will contain both glabrous and pubescent plants. If the plants are sorted on the pubescence character, particularly that of the calyx, the division into groups is much more clear and convincing. Were other characters correlated, it would be logical to maintain both as species, as did Gray and E. Nelson. However, some collections show intermediate conditions, even in the pubescence of the calyx. One such from Palouse Falls, Washington, St. John & Pickett 6152, contained five branches with the glabrous calyces, five with markedly hispidulous calyces, and one scarcely so. These were growing side by side, were collected as one number, and show a blending of the characters. The pubescence of the leaves is usually similar to that of the calyces, but some specimens recombine these characters. The ranges of the two plants are nearly identical.

There is also a glandular pubescent plant which has to be considered. All in all, the writer is convinced that this group is most truly classified as one species, *Phlox longifolia* Nutt., with several varieties.

Key to *Phlox longifolia* and its Varieties.

Plant not glandular pubescent,

Calyx glabrous; leaves glabrous or with sparse basal ciliations.

Phlox longifolia.

Calyx hirsute; leaves usually so, or puberulent.

Var. *linearifolia*.

Plant glandular puberulent.

Var. *puberula*.

✓ *Phlox longifolia* Nutt., Journ. Acad. Nat. Sci. Phila. 7: 41-42, 1834. Perennial, 1-4 dm. tall; tap-root yellowish, elong-

⁶ Am. Journ. Bot. 18: 441-442, 1931.

ate, up to 2 mm. in diameter; crown becoming multicapital, stems repeatedly bushy branched, woody, usually glabrous; leaves 1.2–8 cm. long, 0.5–2 mm. wide, linear, acute, glabrous or villous ciliate at base, the midrib heavy; cymes few flowered, loose; pedicles 3–33 mm. long; calyx 7–14 mm. long, the intercostal portions membranous, saccate extruded at base, the lobes subulate, with a strong green rib; corolla deep pink, the tube 12–14 mm. long, slightly broader above, pilose within at base; the lobes 8–16 mm. long, elliptic-oblong, obtuse; anthers 1.5–2 mm. long, elliptic-oblong; style equaling or well exceeding the calyx, shorter than the corolla; capsule 4–5 mm. long, ellipsoid, yellowish, punctate; seeds 2.3 mm. long, ellipsoid, compressed, brown.

Type locality: In the valleys of the Rocky Mountains generally. (Probably western Montana.)

Specimens examined:

British Columbia: Lake Osoyoos, June 1, 1905, *J. M. Macoun* 68712; Dog Lake, April 20, 1906, *J. R. Anderson*; Fairview, April 26, 1906, *J. R. Anderson*; Penticton, July 26, 1918, *W. B. Anderson*.

Washington: Asotin Co., open hillsides, mouth of Grand Ronde, Sect. 19, T. 7 N., R. 47 E., May 9, 1925, *H. St. John* 3517. Adams Co., sandy sage brush soil, Washtucna, May 23, 1903, *J. S. Cotton* 1035. Franklin Co., Pasco, May 25, 1896, *H. H. Hindshaw* 19; Pasco, May 26, 1899, *C. V. Piper* 2959. Lincoln Co., Sprague, May 30, 1892, *L. F. Henderson*. Yakima Co., sand plains, Sunnyside, May 17, 1901, *J. S. Cotton* 500; North Yakima, 1894, *Mrs. W. L. Steinweg*; dry sage brush land, North Yakima, May 25, 1892, *L. F. Henderson* 2415; North Yakima, April 22, 1898, *C. V. Piper*; gravelly sage brush lands, head of Moxee Valley, May 31, 1902, *D. Griffiths & J. S. Cotton* 31 and 32.

Idaho: Nez Perce Co., hillsides, May 1892, *J. H. Sandberg*.

Oregon: Wallowa Co., grassy hillsides, 1500 ft., Yreka Creek, T. 1. S., R. 50 E., May 21, 1927, *C. English & E. Hardin* 925.

Montana: Valleys of the Rocky Mts. generally (Nutt. from *Wyeth*).

P. longifolia Nutt., var. ***linearifolia*** (Hook.) new comb.; *P. speciosa* Pursh, var. *linearifolia* Hook., Journ. Bot. Kew Miscell. 3: 289, 1851; *P. linearifolia* (Hook.) Gray, Proc. Am. Acad. 8: 255, 1870; *P. longifolia* Nutt., subsp. *linearifolia* (Gray) Brand, Helios 22: 80, 1905. Stems glabrous or pilose; leaves 1.2–6.5 cm. long, 0.5–3 mm. wide, glabrous to puberulent or hirsute; calyx hirsute; corolla lobes obtuse or acute.

Type locality: Only in the valley of the Kooskooskie River and the adjoining plains. June (*C. A. Geyer*) n. 340. (Clearwater River valley near Lewison, Idaho).

Specimens examined:

British Columbia: Summerland, April 22, 1906, *J. R. Anderson*.

Washington: Asotin Co., Asotin, April 7, 1908, *R. K. Beattie*. Adams Co., dry soil, Washtucna, May 18, 1903, *J. S. Cotton* 973. Columbia Co., Dayton, May 16, 1921, *Mrs. Jennie A. Reehes*. Franklin Co., gravelly hillside, Kahlotus, May 20, 1903, *J. S. Cotton* 1011. Grant Co., Quincy, April 20, 1912, *A. D. Foster* 6. Lincoln Co., Sprague, June 10, 1918, *W. P. Taylor* 371. Spokane Co., Spokane, May 19, 1899, *C. V. Piper*; Hangman Creek, 1510 ft., May 23, 1893, *J. H. Sandberg & J. B. Leiberg* 62; Spangle, June 24, 1899, *C. V. Piper*; low prairie at Spangle, June 29, 1916, *W. Suksdorf* 8657b; sparse, on dry grassy hillside, Bonnie Lake, May 30, 1923, *H. St. John, F. L. Pickett & F. A. Warren* 3199. Whitman Co., head of Rock Lake, hills, common, May 28-30, 1904, *R. K. Beattie & W. H. Lawrence* 2428; dry rocky hillside, Rock Creek, west of Winona, April 10, 1924, *H. St. John, J. A. Cary, F. L. Pickett & F. A. Warren* 6265; St. Johns, May 21, 1904, *R. K. Beattie* 2317; dry bluffs above Palouse River, Colfax, July 9, 1922, *C. S. Parker* 578; Snake River bluffs, near Lewiston Idaho, April 14, 1900, *Byron Hunter* 31; dry stony hillside, 2 mi. below sp. at fork of road, Wawawai Canyon, May 19, 1922, *C. S. Parker* 366; Wawawai, May 16, 1892, *E. R. Lake* 594; Wawawai, May 18, 1892, *W. R. Hull*; Wawawai, May 13, 1893, *C. V. Piper* 1513; bluffs of Snake River, Wawawai, June 17, 1899, *C. V. Piper* 3009; Wawawai, April 23, 1921, *H. St. John* 9751; Almota, May 27, 1893, *C. V. Piper*; Pataha, July 5, 1892, *W. R. Hull* 594. Walla Walla Co., Waitsburg, April 21, 1897, *R. M. Horner* 159; April 2, 1911, *G. A. Hill*. Yakima Co., in clumps of sage brush, Rattlesnake Mts. May 1901, *J. S. Cotton* 348.

Idaho: "Oregon," valley of the Kooskooskie, *Geyer* 340. Bear Lake Co., abundant on the hills and flats, Montpelier, May 15, 1910, *J. F. Macbride* 12.

P. longifolia Nutt., var. *puberula* E. Nels., Rev. W. N. Am. Phloxes, Ninth Rept. Wyo. Agr. Coll. 26, 1899 *P. puberula* (E. Nels.) A. Nels., in Coult. & Nels., New Man. Bot. Centl. Rocky Mts. 397, 1909; *P. viridis* E. Nels. 1.c. 24, 1899.

Plant glandular puberulent at least above; pedicels 2-45 mm. long; corolla lobes obtuse, acute, or emarginate.

Type locality: Evanston, Wyo., June 5, 1898, *Aven Nelson* 4544.

Specimens examined:

Washington: Wenatchee, April 12, 1900, *K. Whited*; Wenatchee, April 24, 1900, *K. Whited*; Wenatchee, *K. Whited* 9; Wenatchee, May 28, 1896, *K. Whited* 39; Wenatchee, May 2, 1898, *K. Whited* 628; Wenatchee, May 25, 1899, *K. Whited* 1037; Wenatchee Flat, April 12, 1900, *K. Whited*; Wenatchee Flat, April 15, 1900, *K. Whited*; near Malaga, May 21, 1899, *K. Whited* 1037. Douglas Co., scab lands, Waterville, April 22, 1900, *K. Whited* 1212; Badger Mts., April 24, 1900, *K. Whited* 1212. Klickitat Co., dry hillsides near Columbus, April 23, 1909, *W. Suksdorf* 6508. Yakima Co., bunch grass lands, between

Wenas and Umtahnum Creeks, June 5, 1903, *J. S. Cotton* 1152; Ellensburg, June 5, 1897, *K. Whited*; Naches, May 10, 1923, *E. Nelson* 1451.

Idaho: Ada Co., open inclines, alt. 2880 ft., May 6, 1911, *J. A. Clark* 4. Canyon Co., bench lands, volcanic ash, alt. 220 ft., Fawks Store, April 22, 1911, *J. F. Macbride* 761.

Oregon: sterile ridges of the S. Blue Mts., 4-5000 ft. alt., generally distributed, June 1897, *W. C. Cusick* 1646.

— Wyoming: Uinta Co., Evanston, June 5, 1898, *Aven Nelson* 4544.

UNIVERSITY OF HAWAII,
HONOLULU, HAWAIIAN ISLANDS.